

tive part in remedying this state of things, and the present volume forms the first part of a record of what he accomplished.

The contents are arranged by the editors in sections, the first of which, extending to nearly 200 pages, is headed "Elasticity and Capillarity," and contains the author's earliest published papers. The two papers on capillarity, however, belong to the years 1906 and 1907. In the first of them, the author reproduces the substance of a paper by Lord Rayleigh, on the formation of drops, because, as he says, it had been treated "etwas stiefmütterlich" by German periodicals, and he directs attention to the value of the "method of dimensions" used by Lord Rayleigh.

The second section, nearly 100 pages, relating to "Heat, Thermoelectricity, and Gaseous Mechanics," contains almost the only exclusively theoretical paper in the volume. In this paper, Kohlrausch starts from the fact that differences of temperature between neighbouring parts of continuous pieces of metal are an essential condition of the action of a thermoelectric couple. He points out that a thermoelectric current is therefore necessarily accompanied by a current of heat, and, assuming a mutual convective action between these two currents—that an electric current conveys heat and that a current of heat conveys electricity—and assuming further that the quantity of electricity conveyed by a given flow of heat depends on the temperature of the conductor, he arrives at the ordinary formula, which represents the electromotive force of a thermoelectric couple as being proportional to the difference of temperature of the junctions multiplied by the difference between their mean temperature and a fixed temperature depending on the nature of the couple.

The third section, fifty pages, devoted to "Optics," deals chiefly with a method of measuring indices of refraction founded on the phenomenon of total reflection.

The fourth section, more than 650 pages, "Electrical and Magnetic (absolute) Measurements and Methods of Measurement," is the most important in the book. We may mention specially a paper on the "Absolute Value of Siemens's Unit of Resistance," which contains an acute and interesting criticism of the experiments of the British Association Committee. Unfortunately, in his own experiments, Kohlrausch adopted, without personally verifying them, the dimensions of a coil that had been wound by Weber, although he carefully determined every other quantity involved, with the consequence that he obtained an erroneous result. A later determination of the "Absolute Resistance of Mercury" led almost exactly to the value now adopted as the most accurate. The same may be said of a determination of the "Electrochemical Equivalent of Silver," which he carried out in conjunction with his brother Wilhelm. These two investigations seem to have been conducted with the utmost care, and they afford striking examples of the multitude of minute precautions that must be observed when great accuracy is aimed at in the determination of a physical constant. These two papers are the most elaborate in the volume, but all go to show the author's love of exact measurement and furnish

evidence that he was pre-eminently in his right place when he was appointed president of the Reichsanstalt.

A final section, 100 pages, is headed "Miscellaneous and Books." It contains some interesting addresses and reports and biographical notices, and the preface to the last (eleventh) edition of the author's "Lehrbuch der praktischen Physik," first published in 1870, under the title "Leitfaden der praktischen Physik."

It only remains to add that the volume is excellently printed and very carefully edited.

G. C. F.

#### A MODERN HISTORY OF CHEMISTRY.

*A Concise History of Chemistry.* By T. P. Hilditch. Pp. ix + 263. (London: Methuen and Co., Ltd., n.d.) Price 2s. 6d.

IN this book an attempt is made to trace the development of chemistry from the point of view of its present-day position—that is, from the point of view, say, of a traveller who, having reached his goal, seeks to retrace his route, and to survey, as if from an eminence, the devious and dimly indicated wanderings by which he has attained the coign of vantage he has gained. There are, of course, two ways of writing history. The first, which is by far the more difficult, inasmuch as it presupposes profound knowledge and extensive research, combined with imagination and the faculty of detachment, is for the historian to seek to project himself, as it were, into the particular period with which he is dealing at the moment, and to attempt to elucidate it from the contemporary point of view. In this way he becomes a faithful chronicler of the epoch, reflecting its spirit, correcting its errors, supplementing its truths, and making manifest the gradual evolution and enlargement of the special phase of intellectual, moral, social, or political development with which he may be concerned. Or he may, as in the present case, view the whole course retrospectively. This, no doubt, has certain advantages. But when applied to chemistry it is apt to do an injustice to one's predecessors by belittling their successive contributions to the general knowledge: there is apparently so much chaff to be winnowed, and the kernels of good grain would seem to be so few and so small in comparison with the harvest of to-day. It is apt, too, to give false impressions of the course of reasoning—the movement of the time—by which the early speculators were led to formulate their attempts at a chemical system. It is impossible to do full justice to their efforts unless the historian has that complete sympathy with them which comes from trying to put himself in their place, and so appreciating the motives by which they were guided or impelled.

In a volume of some 250 small octavo pages, which seeks to trace, in the broadest possible outline, the growth of chemistry from the earliest times to the present epoch, there is not much room for dwelling on the philosophy of its history. Mr. Hilditch is chiefly concerned more with results than with motives—with the ordering in historical sequence—of the significant facts of the science, and it is quite remarkable what a number of such facts he has contrived to

pack within the limited compass of his book. To the busy student who seeks to acquire merely an *aperçu* of the main current in the gradually broadening stream of chemical knowledge, and has but little interest in the personal aspects or human element in the story, the compilation, concise as it is, will be invaluable. Indeed, the author frankly confesses that his book "is designed more especially for those students whose interest in this aspect of the science is stimulated by the inclusion of 'historical chemistry' in the syllabus of examinations which concern them."

The examinee will certainly get a perfect plethora of the facts of chemical history if he steadily works his way through this volume. Even if he is unable to assimilate a moiety of them, he will at least have the satisfaction of knowing that he possesses in Mr. Hilditch's book a trustworthy and fairly comprehensive work of reference, and as such we warmly recommend it to every chemist, whether he be an examinee or not. The book is excellent in plan, and, in spite of its conciseness, eminently readable. Its arrangement readily enables the searcher to discover the origin and date of practically every fact of importance, even without the aid of the synoptical tables and very full index which are appended.

The book differs from all other works of the kind in its modernity. The author is more concerned, apparently, with the chemistry of our own times than with that of any preceding epoch. There are other works which deal more fully with the science of bygone ages, but there is certainly no book in our language which treats of the story of our own age with the same degree of fulness as the volume before us, and we hope that its sale will be such as to encourage the author to maintain it at its pretty high level of completeness.

#### THE ANOPHELINE MOSQUITOES OF INDIA.

*A Monograph of the Anopheline Mosquitoes of India.*

By Dr. S. P. James and Dr. W. G. Liston. Second edition, rewritten and enlarged. Pp. viii+128+xv plates. (Calcutta: Thacker, Spink and Co.; London: W. Thacker and Co., 1911.) Price 16 rupees net (25s. net).

THE second edition of this work has been long looked for, and we now welcome it in much the same guise as before; for, although "enlarged," it has actually fewer pages than the first edition, the enlargement apparently referring to new plates, though the number of coloured plates remains the same as before. These coloured plates are so excellent that it is a pity that their number could not have been increased. In our opinion the outstanding merits of this book are the clearness of the descriptions and figures, and the provision of very good analytical tables.

We are glad in this edition to see Theobald's scale classification adopted as a first step in arranging the Indian anophelines in their proper zoological position. The authors are quite justified in their criticism of a good deal of scale nomenclature and their admirable plates of scales are a welcome addition, but their division of scales into "false" and "true" is hardly a happy one. In our opinion, "striate" and "non-

striate" would have been better terms. In their attempts at revision of specific and generic names, the authors are a law unto themselves. It is not merely a question of nice judgment on the evidence for and against such a name, but there are violations of well-understood and accepted rules. We could give numerous examples of this, but one must suffice. Thus a certain African anopheline bears the name *Nyssorhynchus maculipalpis* (Giles). The authors accept Theobald's opinion that the so-called Indian *maculipalpis* is different; they therefore "change" the name of the Indian species to *maculipalpis* (James and Liston). This substitution of their name is, of course, no change at all, but it leaves us with two identical specific names in the same genus. A new name for the Indian species is imperative. We would appeal to the authors to consider this question of nomenclature, and to study carefully the laws governing it, and then publish a list of Indian anophelines with their synonyms. It is their duty to acquaint themselves with the matter fully, even down to the correct way of writing a specific name and its author.

We suppose the method advocated (p. 26) for mounting a collection of mosquitoes has advantages, or it would not have been adopted by the Central Malarial Bureau, but it certainly seems cumbersome, and to fasten nine different objects on to a board with *elastic bands* must sooner or later, in India of all places, spell certain disaster, *i.e.* loss of some of the objects.

Although the book contains an index of specific names, yet generic ones are omitted, and the general index of the first edition has disappeared—a distinct loss. We have noted several erroneous references to plates; *e.g.* three out of five on p. 7 are wrong. As is evident from reading the book, much work remains to be done on the male genitalia, larval stigmata, and eggs, and indeed on the whole bionomics of the Indian anophelines, but this will, we hope, now soon be remedied in India. The book has not, then, reached that ideal standard of excellence we had hoped for, but it must in justice be said, and this is a very practical point, that a worker with this book at his disposal will be able to find out with ease which of the some three dozen Indian anophelines his may be, although in several cases he will certainly be giving them erroneous names.

#### MINERALS OF RHODESIA.

*The Mineral Industry of Rhodesia.* By J. P. Johnson.

Pp. iv+90. (London: Longmans, Green and Co., 1911.) Price 8s. 6d. net.

THIS book is specially addressed to the prospector, and gives a good deal of information as to the occurrence of gold and minerals of economic value that have been worked in Rhodesia, the conditions under which they have been found, and mines of importance with their yields. It also gives an account of the occurrence of tin in other mines of South Africa outside Rhodesia, where minerals have been worked which the author thinks might reasonably be expected within the limits of the colony itself.

Gold has proved, up to now, the most important of